



## TECHNICAL NOTE

D-1244

A TABULATION OF SECTION AERODYNAMIC CHARACTERISTICS  
AT MACH NUMBERS OF 1.61 AND 2.01 FOR FOUR  
SWEPT WINGS HAVING THE SAME PLANFORM  
BUT DIFFERENT SURFACE SHAPES

By Emma Jean Landrum

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
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## A TABULATION OF SECTION AERODYNAMIC CHARACTERISTICS

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## SUMMARY

The section normal-force and pitching-moment coefficients for four sweptback wings with different surface shapes are tabulated. All the wings had NACA 65A005 thickness distributions, 50° of sweepback at the quarter chord, a taper ratio of 0.20, and an aspect ratio of 3.5. There were three twisted wings and one flat wing. The twisted wings had 6° of washout at the tip, but the twist variation along the span was either linear, quadratic, or cubic. The wings were tested at Mach numbers of 1.61 and 2.01 with fixed and free transition through a Reynolds number range of  $1.7 \times 10^6$  to  $3.6 \times 10^6$ . Angle-of-attack range was from -20° to 20°.

## INTRODUCTION

The usefulness of camber and twist in the design of efficient wings for supersonic aircraft has been given considerable study over the past several years. Of current interest is the prediction of the changes in aerodynamic characteristics of wings when they distort under variable flight loads. In order to obtain some insight into these problems of distortion, a general investigation of the effects of arbitrary camber and twist built into nearly rigid models is being made at low supersonic speeds by means of pressure-distribution and force tests. The tabulated results of a pressure investigation of the separate effects of camber and twist on the aerodynamic characteristics of a sweptback wing at Mach numbers of 1.61 and 2.01 are presented in reference 1, and a limited analysis of some of these results is presented in reference 2. The results of a force study of the same wings are given in reference 3. The section normal-force and pitching-moment coefficients for the flat and twisted wings of reference 1, obtained by streamwise integration of the pressure distributions, are tabulated in this report. No analysis of the data is made.

## SYMBOLS

- $\bar{c}$  mean aerodynamic chord, 10.33 in.  
 $\alpha$  angle of attack of root chord, deg

## MODELS AND MODEL MOUNTING

Four semispan wings with the same planform but different surface shapes were tested: one was flat (designated wing F), and three were twisted (designated wings 1, 2, and 3). These designations correspond to those used in references 1 and 3.

All of the wings had an NACA 65A005 thickness distribution,  $50^\circ$  of sweepback at the quarter-chord line, a taper ratio of 0.20, and an aspect ratio of 3.5. A plan view of the models is shown in figure 1.

The twisted wings were derived from the flat wing by rotating each spanwise station about the leading edge. Linear, quadratic, and cubic spanwise variations of twist (wings 1, 2, and 3, respectively) were used. Each twisted wing had  $6^\circ$  of washout at the tip.

The flat wing had six streamwise rows of orifices located at 0.05, 0.20, 0.35, 0.50, 0.70, and 0.90 semispan. On the twisted wings, the 0.90 semispan station was omitted and replaced by stations at 0.825 and 0.95 semispan. (See fig. 1.)

The semispan wings were mounted horizontally in the tunnel from a turntable in a boundary-layer bypass plate which was located vertically in the test section about 10 inches from the tunnel wall.

## TESTS AND TEST PROCEDURES

The tests were conducted in the Langley 4- by 4-foot supersonic pressure tunnel at Mach numbers of 1.61 and 2.01. At both Mach numbers all the wings were tested with fixed and free transition. Transition was fixed about 1/2 inch from the wing leading edge by grains of No. 60 carborundum.

Angle of attack was changed manually by rotating the turntable on which the models were mounted and was measured by a vernier scale outside the tunnel. The angle-of-attack range was from  $-20^\circ$  to  $20^\circ$  although the complete range was not obtained for all wings at all test conditions.

Tunnel stagnation pressures of 8 and 15 pounds per square inch absolute were used to provide a range of Reynolds numbers, based on  $\bar{c}$ , from  $1.7 \times 10^6$  to  $3.6 \times 10^6$ .

Measurements of tip deflection made during the tests indicated a maximum in aeroelastic twist variation for all wings occurred near an angle of attack of  $10^\circ$  and, for a stagnation pressure of 15 pounds per square inch absolute, amounted to about  $1.5^\circ$  of washout. Lower angles of attack or lower stagnation pressures gave proportionately smaller values of aeroelastic tip twist.

#### TABLES

The section normal-force and pitching-moment coefficients for the various spanwise stations are presented in tables 1 to 4 for the four wings. Table 1 is for the flat wing (wing F); tables 2, 3, and 4 are for the wings with linear, quadratic, and cubic variations of twist (wings 1, 2, and 3, respectively). For any given table, the order of parameter change is from free to fixed transition, from lower to higher Reynolds number, and from lower to higher Mach number.

Langley Research Center,  
National Aeronautics and Space Administration,  
Langley Air Force Base, Va., January 31, 1962.

#### REFERENCES

1. Grant, Frederick C.: A Tabulation of Wind-Tunnel Pressure Data at Mach Numbers of 1.61 and 2.01 for Five Swept Wings of the Same Plan Form but Different Surface Shapes. NACA RM L58D23, 1958.
2. Grant, Frederick C., and Mugler, John P., Jr.: Span Loadings Due to Wing Twist at Transonic and Supersonic Speeds. NACA RM L57D24a, 1957.
3. Landrum, Emma Jean, and Czarnecki, K. R.: Effects at Mach Numbers of 1.61 and 2.01 of Camber and Twist on the Aerodynamic Characteristics of Three Swept Wings Having the Same Planform. NASA TN D-929, 1961.

TABLE 1.- AERODYNAMIC CHARACTERISTICS FOR WING F

		MACH NUMBER = 1.61		REYNOLDS NUMBER = 1 <sup>9</sup> MILLION		FREE TRANSITION	
$\alpha$ , DEG		FRACTION OF SEMISPAN					
		.05	.20	.35	.50	.70	.90
SECTION NORMAL-FORCE COEFFICIENT							
-20	-1.062	-1.116	-1.065	-.911	-.645	-.345	
-18	-.921	-.964	-.928	-.831	-.633	-.354	
-16	-.792	-.832	-.806	-.720	-.571	-.385	
-14	-.679	-.707	-.705	-.635	-.486	-.347	
-12	-.585	-.598	-.598	-.563	-.425	-.280	
-10	-.478	-.488	-.496	-.481	-.368	-.239	
-08	-.372	-.381	-.391	-.381	-.314	-.201	
-06	-.266	-.282	-.298	-.288	-.243	-.160	
-04	-.175	-.189	-.197	-.189	-.166	-.115	
-02	-.086	-.096	-.095	-.096	-.081	-.054	
00	.000	.000	.000	.000	.000	.000	
02	.086	.096	.095	.096	.081	.054	
04	.175	.189	.197	.189	.166	.115	
06	.266	.282	.298	.288	.243	.160	
08	.372	.381	.391	.381	.314	.201	
10	.478	.488	.496	.481	.368	.239	
12	.585	.598	.598	.563	.425	.280	
14	.679	.707	.705	.635	.486	.347	
16	-.792	-.832	-.806	-.720	-.571	-.385	
18	-.921	-.964	-.928	-.831	-.633	-.354	
20	1.062	1.116	1.065	.911	.645	.345	
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-.319	-.074	.191	.366	.452	.351	
-18	-.285	-.080	.153	.337	.447	.360	
-16	-.256	-.083	.120	.284	.406	.392	
-14	-.225	-.081	.096	.246	.342	.355	
-12	-.193	-.072	.069	.213	.297	.285	
-10	-.160	-.064	.051	.178	.254	.242	
-08	-.127	-.050	.037	.133	.217	.202	
-06	-.092	-.038	.027	.097	.165	.160	
-04	-.062	-.026	.017	.063	.110	.115	
-02	-.031	-.012	.009	.031	.053	.053	
00	.000	.000	.000	.000	.000	.000	
02	.031	.012	-.009	-.031	-.053	-.053	
04	.062	.026	-.017	-.063	-.110	-.115	
06	.092	.038	-.027	-.097	-.165	-.160	
08	.127	.050	-.037	-.133	-.217	-.202	
10	.160	.064	-.051	-.178	-.254	-.242	
12	.193	.072	-.069	-.213	-.297	-.285	
14	.225	.081	-.096	-.246	-.342	-.355	
16	.256	.083	-.120	-.284	-.406	-.392	
18	.285	.080	-.153	-.337	-.447	-.360	
20	.319	.074	-.191	-.366	-.452	-.351	

TABLE 1.- AERODYNAMIC CHARACTERISTICS FOR WING F  
CONTINUED

		MACH NUMBER = 1.61		REYNOLDS NUMBER = 1.9 MILLION		FIXED TRANSITION	
$\alpha$ , DEG		FRACTION OF SEMISPAN					
		.05	.20	.35	.50	.70	.90
		SECTION	NORMAL-FORCE	COEFFICIENT			
-20	-1.065	-1.124	-1.057	-897	-650	-345	
-18	-913	-969	-915	-826	-635	-363	
-16	-781	-823	-798	-722	-570	-389	
-14	-667	-700	-707	-637	-479	-347	
-12	-565	-589	-599	-551	-419	-280	
-10	-457	-481	-496	-474	-374	-243	
-08	-372	-396	-397	-380	-316	-202	
-06	-269	-294	-301	-282	-241	-161	
-04	-188	-207	-189	-182	-160	-001	
-02	-117	-092	-093	-094	-081	-057	
00	.000	.000	.000	.000	.000	.000	
02	.117	.092	.093	.094	.081	.057	
04	.188	.207	.189	.182	.160	.116	
06	.269	.294	.301	.282	.241	.161	
08	.372	.396	.397	.380	.316	.202	
10	.457	.481	.496	.474	.374	.243	
12	.565	.589	.599	.551	.419	.280	
14	.667	.700	.707	.637	.479	.347	
16	.781	.823	.798	.722	.570	.389	
18	.913	.969	.915	.826	.635	.363	
20	1.065	1.124	1.057	.897	.650	.345	
		SECTION	PITCHING-MOMENT	COEFFICIENT			
-20	-319	-079	.187	.359	.456	.351	
-18	-284	-082	.146	.333	.449	.370	
-16	-252	-083	.118	.288	.406	.396	
-14	-221	-084	.094	.246	.335	.355	
-12	-189	-076	.069	.208	.291	.285	
-10	-155	-064	.051	.174	.259	.246	
-08	-126	-053	.038	.133	.218	.203	
-06	-93	-039	.028	.094	.164	.161	
-04	-64	-030	.016	.060	.106	.117	
-02	-032	-014	.008	.030	.053	.056	
00	.000	.000	.000	.000	.000	.000	
02	.032	.014	-008	-030	-053	-056	
04	.064	.030	-016	-060	-106	-117	
06	.093	.039	-028	-094	-164	-161	
08	.126	.053	-038	-133	-218	-203	
10	.155	.064	-051	-174	-259	-246	
12	.189	.076	-069	-208	-291	-285	
14	.221	.084	-094	-246	-335	-355	
16	.252	.083	-118	-288	-406	-396	
18	.284	.082	-146	-333	-449	-370	
20	.319	.079	-187	-359	-456	-351	

TABLE 1.- AERODYNAMIC CHARACTERISTICS FOR WING F  
CONTINUED

MACH NUMBER = 1.61 REYNOLDS NUMBER = 3.6 MILLION FREE TRANSITION

$\alpha$ , DEG	FRACTION OF SEMISPAN					
	.05	.20	.35	.50	.70	.90
	SECTION	NORMAL-FORCE COEFFICIENT				
-20	-1.039	-1.087	-1.010	-.877	-.623	-.339
-18	-.897	-.943	-.919	-.799	-.617	-.390
-16	-.777	-.793	-.813	-.703	-.542	-.385
-14	-.656	-.675	-.681	-.617	-.468	-.324
-12	-.566	-.589	-.598	-.548	-.423	-.275
-10	-.461	-.481	-.489	-.473	-.364	-.234
-08	-.364	-.384	-.387	-.372	-.307	-.197
-06	-.274	-.284	-.290	-.279	-.240	-.158
-04	-.183	-.198	-.198	-.189	-.162	-.115
-02	-.086	-.097	-.097	-.091	-.079	-.056
00	.000	.000	.000	.000	.000	.000
02	.086	.097	.097	.091	.079	.056
04	.183	.198	.198	.189	.162	.115
06	.274	.284	.290	.279	.240	.158
08	.364	.384	.387	.372	.307	.197
10	.461	.481	.489	.473	.364	.234
12	.566	.589	.598	.548	.423	.275
14	.656	.675	.681	.617	.468	.324
16	.777	.793	.813	.703	.542	.385
18	.897	.943	.919	.799	.617	.390
20	1.039	1.087	1.010	-.877	-.623	-.339
SECTION PITCHING-MOMENT COEFFICIENT						
-20	-.320	-.080	.168	.353	.438	.344
-18	-.286	-.083	.149	.317	.437	.396
-16	-.258	-.087	.123	.272	.383	.393
-14	-.220	-.086	.084	.233	.327	.331
-12	-.191	-.077	.065	.201	.295	.278
-10	-.157	-.064	.048	.174	.253	.236
-08	-.125	-.052	.036	.128	.212	.198
-06	-.095	-.039	.026	.093	.164	.158
-04	-.065	-.027	.017	.062	.107	.115
-02	-.031	-.014	.008	.029	.052	.055
00	.000	.000	.000	.000	.000	.000
02	.031	.014	-.008	-.029	-.052	-.055
04	.065	.027	-.017	-.062	-.107	-.115
06	.095	.039	-.026	-.093	-.164	-.158
08	.125	.052	-.036	-.128	-.212	-.198
10	.157	.064	-.048	-.174	-.253	-.236
12	.191	.077	-.065	-.201	-.295	-.278
14	.220	.086	-.084	-.233	-.327	-.331
16	.258	.087	-.123	-.272	-.383	-.393
18	.286	.083	-.149	-.317	-.437	-.396
20	.320	.080	-.168	-.353	-.438	-.344

TABLE 1.- AERODYNAMIC CHARACTERISTICS FOR WING F  
CONTINUED

MACH NUMBER = 1.61		REYNOLDS NUMBER = 3.6 MILLION		FIXED TRANSITION			
$\alpha$ , DEG		FRACTION OF SEMISPAN					
		.05	.20	.35	.50	.70	.90
SECTION NORMAL-FORCE COEFFICIENT							
-20	-1.033	-1.087	-1.019	-.888	-.652	-.346	
-18	-.889	-.935	-.903	-.791	-.611	-.388	
-16	-.770	-.802	-.794	-.686	-.532	-.375	
-14	-.653	-.678	-.684	-.611	-.463	-.323	
-12	-.554	-.581	-.588	-.533	-.411	-.274	
-10	-.465	-.489	-.494	-.468	-.365	-.238	
-08	-.367	-.388	-.392	-.376	-.309	-.202	
-06	-.272	-.286	-.295	-.283	-.241	-.163	
-04	-.166	-.179	-.187	-.179	-.151	-.113	
-02	-.084	-.094	-.096	-.091	-.077	-.054	
00	.000	.000	.000	.000	.000	.000	
02	.084	.094	.096	.091	.077	.054	
04	.166	.179	.187	.179	.151	.113	
06	.272	.286	.295	.283	.241	.163	
08	.367	.388	.392	.376	.309	.202	
10	.465	.489	.494	.468	.365	.238	
12	.554	.581	.588	.533	.411	.274	
14	.653	.678	.684	.611	.463	.323	
16	.770	.802	.794	.686	.532	.375	
18	.889	.935	.903	.791	.611	.388	
20	1.033	1.087	1.019	-.888	-.652	-.346	
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-.319	-.079	.174	.356	.458	.354	
-18	-.284	-.082	.143	.313	.432	.394	
-16	-.254	-.086	.115	.262	.375	.382	
-14	-.220	-.085	.085	.230	.323	.330	
-12	-.187	-.076	.066	.194	.284	.278	
-10	-.158	-.066	.050	.169	.253	.241	
-08	-.125	-.052	.037	.130	.213	.204	
-06	-.094	-.039	.027	.095	.164	.164	
-04	-.059	-.025	.015	.058	.100	.113	
-02	-.031	-.013	.009	.029	.051	.054	
00	.000	.000	.000	.000	.000	.000	
02	.031	.013	-.009	-.029	-.051	-.054	
04	.059	.025	-.015	-.058	-.100	-.113	
06	.094	.039	-.027	-.095	-.164	-.164	
08	.125	.052	-.037	-.130	-.213	-.204	
10	.158	.066	-.050	-.169	-.253	-.241	
12	.187	.076	-.066	-.194	-.284	-.278	
14	.220	.085	-.085	-.230	-.323	-.330	
16	.254	.086	-.115	-.262	-.375	-.382	
18	.284	.082	-.143	-.313	-.432	-.394	
20	.319	.079	-.174	-.356	-.458	-.354	

TABLE 1.- AERODYNAMIC CHARACTERISTICS FOR WING F  
CONTINUED

MACH NUMBER = 2.01		REYNOLDS NUMBER = 1 <sup>7</sup> MILLION		FREE TRANSITION	
$\alpha$ , DEG		FRACTION OF SEMISPAN			
		.05	.20	.35	.50
SECTION NORMAL-FORCE COEFFICIENT					
-20	-.849	-.835	-.728	-.466	-.301
-18	-.786	-.779	-.679	-.444	-.286
-16	-.661	-.670	-.603	-.515	-.252
-14	-.566	-.579	-.533	-.458	-.224
-12	-.487	-.502	-.481	-.414	-.202
-10	-.404	-.415	-.399	-.350	-.173
-08	-.323	-.332	-.322	-.287	-.142
-06	-.230	-.241	-.237	-.217	-.108
-04	-.162	-.172	-.163	-.152	-.076
-02	-.070	-.077	-.074	-.068	-.034
00	.000	.000	.000	.000	.000
02	.070	.077	.074	.068	.034
04	.162	.172	.163	.152	.076
06	.230	.241	.237	.217	.108
08	.323	.332	.322	.287	.142
10	.404	.415	.399	.350	.173
12	.487	.502	.481	.414	.202
14	.566	.579	.533	.458	.224
16	.661	.670	.603	.515	.252
18	.786	.779	.679	.578	.286
20	.849	.835	.728	.617	.301
SECTION PITCHING-MOMENT COEFFICIENT					
-20	-.279	-.071	.104	.326	.306
-18	-.260	-.070	.096	.310	.291
-16	-.221	-.064	.083	.270	.255
-14	-.190	-.061	.071	.238	.226
-12	-.166	-.056	.064	.213	.203
-10	-.138	-.050	.051	.182	.174
-08	-.111	-.041	.038	.149	.142
-06	-.080	-.030	.026	.112	.108
-04	-.057	-.022	.018	.078	.075
-02	-.026	-.010	.006	.035	.033
00	.000	.000	.000	.000	.000
02	.026	.010	-.006	-.035	-.033
04	.057	.022	-.018	-.078	-.075
06	.080	.030	-.026	-.112	-.108
08	.111	.041	-.038	-.149	-.142
10	.138	.050	-.051	-.182	-.174
12	.166	.056	-.064	-.213	-.203
14	.190	.061	-.071	-.238	-.226
16	.221	.064	-.083	-.270	-.255
18	.260	.070	-.096	-.310	-.291
20	.279	.071	-.104	-.326	-.306

TABLE 1.- AERODYNAMIC CHARACTERISTICS FOR WING F  
CONTINUED

		MACH NUMBER = 2.01 REYNOLDS NUMBER = 1.7 MILLION FIXED TRANSITION					
$\alpha$ , DEG		FRACTION OF SEMISPAN					
		.05	.20	.35	.50	.70	.90
SECTION NORMAL-FORCE COEFFICIENT							
-20							
-18	-.727	-.727	-.648	-.554	-.414	-.266	
-16	-.640	-.646	-.586	-.502	-.380	-.245	
-14	-.543	-.548	-.515	-.445	-.337	-.218	
-12	-.462	-.470	-.448	-.391	-.297	-.193	
-10	-.389	-.398	-.376	-.334	-.260	-.169	
-08	-.302	-.312	-.297	-.272	-.213	-.138	
-06	-.245	-.252	-.242	-.224	-.178	-.117	
-04	-.135	-.145	-.138	-.131	-.108	-.073	
-02							
00	.000	.000	.000	.000	.000	.000	
02							
04	.135	.145	.138	.131	.108	.073	
06	.245	.252	.242	.224	.178	.117	
08	.302	.312	.297	.272	.213	.138	
10	.389	.398	.376	.334	.260	.169	
12	.462	.470	.448	.391	.297	.193	
14	.543	.548	.515	.445	.337	.218	
16	.640	.646	.586	.502	.380	.245	
18	.727	.727	.648	.554	.414	.266	
20							
SECTION PITCHING-MOMENT COEFFICIENT							
-20							
-18	-.241	-.068	.090	.210	.288	.270	
-16	-.214	-.066	.079	.188	.263	.248	
-14	-.184	-.062	.068	.165	.232	.221	
-12	-.157	-.057	.058	.144	.203	.194	
-10	-.133	-.049	.044	.123	.177	.170	
-08	-.104	-.040	.032	.099	.145	.138	
-06	-.086	-.033	.025	.080	.121	.117	
-04	-.051	-.021	.012	.045	.073	.073	
-02							
00	.000	.000	.000	.000	.000	.000	
02							
04	.051	.021	-.012	-.045	-.073	-.073	
06	.086	.033	-.025	-.080	-.121	-.117	
08	.104	.040	-.032	-.099	-.145	-.138	
10	.133	.049	-.044	-.123	-.177	-.170	
12	.157	.057	-.058	-.144	-.203	-.194	
14	.184	.062	-.068	-.165	-.232	-.221	
16	.214	.066	-.079	-.188	-.263	-.248	
18	.241	.068	-.090	-.210	-.288	-.270	
20							

TABLE 1.- AERODYNAMIC CHARACTERISTICS FOR WING F  
CONTINUED

MACH NUMBER = 2.01 REYNOLDS NUMBER = 3.1 MILLION FREE TRANSITION

$\alpha$ , DEG	FRACTION OF SEMISPAN					
	.05	.20	.35	.50	.70	.90
	SECTION	NORMAL-FORCE COEFFICIENT				
-20	-.828	-.817	-.732	-.615	-.465	-.302
-18	-.748	-.744	-.666	-.564	-.433	-.282
-16	-.665	-.664	-.614	-.523	-.395	-.254
-14	-.568	-.572	-.545	-.466	-.352	-.226
-12	-.475	-.485	-.480	-.412	-.309	-.202
-10	-.389	-.401	-.389	-.345	-.266	-.173
-08	-.307	-.320	-.313	-.284	-.222	-.143
-06	-.229	-.240	-.226	-.213	-.173	-.112
-04	-.139	-.151	-.152	-.142	-.111	-.074
-02	-.077	-.079	-.076	-.071	-.063	-.042
00	.000	.000	.000	.000	.000	.000
02	.077	.079	.076	.071	.063	.042
04	.139	.151	.152	.142	.111	.074
06	.229	.240	.226	.213	.173	.112
08	.307	.320	.313	.284	.222	.143
10	.389	.401	.389	.345	.266	.173
12	.475	.485	.480	.412	.309	.202
14	.568	.572	.545	.466	.352	.226
16	.665	.664	.614	.523	.395	.254
18	.748	.744	.666	.564	.433	.282
20	.828	.817	.732	.615	.465	.302
SECTION PITCHING-MOMENT COEFFICIENT						
-20	-.276	-.078	.101	.231	.323	.307
-18	-.250	-.075	.089	.210	.300	.286
-16	-.224	-.070	.084	.197	.274	.257
-14	-.193	-.066	.074	.174	.243	.227
-12	-.162	-.060	.064	.153	.212	.203
-10	-.134	-.051	.047	.127	.182	.174
-08	-.107	-.042	.035	.104	.152	.143
-06	-.081	-.032	.023	.078	.118	.112
-04	-.051	-.020	.015	.049	.075	.074
-02	-.029	-.010	.007	.024	.043	.042
00	.000	.000	.000	.000	.000	.000
02	.029	.010	-.007	-.024	-.043	-.042
04	.051	.020	-.015	-.049	-.075	-.074
06	.081	.032	-.023	-.078	-.118	-.112
08	.107	.042	-.035	-.104	-.152	-.143
10	.134	.051	-.047	-.127	-.182	-.174
12	.162	.060	-.064	-.153	-.212	-.203
14	.193	.066	-.074	-.174	-.243	-.227
16	.224	.070	-.084	-.197	-.274	-.257
18	.250	.075	-.089	-.210	-.300	-.286
20	.276	.078	-.101	-.231	-.323	-.307

TABLE 1.- AERODYNAMIC CHARACTERISTICS FOR WING F  
CONCLUDED

	MACH NUMBER = 2.01	REYNOLDS NUMBER = 3.1 MILLION	FIXED TRANSITION			
$\alpha$ , DEG	FRACTION OF SEMISPAN					
	.05	.20	.35	.50	.70	.90
SECTION NORMAL-FORCE COEFFICIENT						
-20	-.830	-.814	-.732	-.615	-.463	-.301
-18	-.741	-.742	-.668	-.564	-.427	-.279
-16	-.648	-.661	-.604	-.519	-.392	-.254
-14	-.558	-.567	-.538	-.464	-.349	-.226
-12	-.475	-.485	-.464	-.406	-.309	-.200
-10	-.394	-.407	-.396	-.351	-.265	-.174
-08	-.310	-.321	-.312	-.282	-.216	-.143
-06	-.232	-.240	-.232	-.213	-.166	-.109
-04	-.151	-.159	-.156	-.143	-.114	-.076
-02	-.074	-.078	-.073	-.069	-.056	-.038
00	.000	.000	.000	.000	.000	.000
02	.074	.078	.073	.069	.056	.038
04	.151	.159	.156	.143	.114	.076
06	.232	.240	.232	.213	.166	.109
08	.310	.321	.312	.282	.216	.143
10	.394	.407	.396	.351	.265	.174
12	.475	.485	.464	.406	.309	.200
14	.558	.567	.538	.464	.349	.226
16	.648	.661	.604	.519	.392	.254
18	.741	.742	.668	.564	.427	.279
20	.830	.814	.732	.615	.463	.301
SECTION PITCHING-MOMENT COEFFICIENT						
-20	-.276	-.075	.101	.231	.322	.306
-18	-.248	-.073	.090	.210	.297	.283
-16	-.217	-.068	.083	.196	.272	.257
-14	-.189	-.064	.072	.174	.241	.228
-12	-.162	-.058	.059	.151	.213	.202
-10	-.135	-.050	.048	.130	.182	.175
-08	-.108	-.041	.035	.103	.147	.144
-06	-.081	-.031	.026	.076	.112	.110
-04	-.054	-.020	.016	.050	.077	.076
-02	-.028	-.010	.007	.024	.038	.038
00	.000	.000	.000	.000	.000	.000
02	.028	.010	-.007	-.024	-.038	-.038
04	.054	.020	-.016	-.050	-.077	-.076
06	.081	.031	-.026	-.076	-.112	-.110
08	.108	.041	-.035	-.103	-.147	-.144
10	.135	.050	-.048	-.130	-.182	-.175
12	.162	.058	-.059	-.151	-.213	-.202
14	.189	.064	-.072	-.174	-.241	-.228
16	.217	.068	-.083	-.196	-.272	-.257
18	.248	.073	-.090	-.210	-.297	-.283
20	.276	.075	-.101	-.231	-.322	-.306

TABLE 2.- AERODYNAMIC CHARACTERISTICS FOR WING 1

MACH NUMBER = 1.61			REYNOLDS NUMBER = 1.9 MILLION			FREE TRANSITION	
$\alpha$ , DEG	FRACTION OF SEMISPAN						
	.05	.20	.35	.50	.70	.825	.95
SECTION NORMAL-FORCE COEFFICIENT							
-20	-1.118	-1.176	-1.088	-0.928	-0.648	-0.466	-0.294
-18	-0.958	-1.016	-0.978	-0.874	-0.633	-0.465	-0.291
-16	-0.831		-0.860	-0.780	-0.601	-0.456	-0.290
-14	-0.713	-0.750	-0.755	-0.688	-0.544	-0.445	-0.305
-12	-0.602	-0.625	-0.650	-0.608	-0.488	-0.399	-0.296
-10	-0.503	-0.527	-0.557	-0.546	-0.440	-0.361	-0.266
-08	-0.404	-0.433	-0.464	-0.460	-0.394	-0.324	-0.237
-06	-0.301	-0.327	-0.365	-0.363	-0.336	-0.284	-0.213
-04	-0.205	-0.227	-0.271	-0.270	-0.268	-0.238	-0.182
-02	-0.111	-0.128	-0.169	-0.176	-0.187	-0.183	-0.146
00	-0.018	-0.032	-0.068	-0.081	-0.103	-0.112	-0.108
02	.054	.045	.016	.000	-0.031	-0.052	-0.057
04	.151	.142	.115	.099	.049	.019	-0.008
06	.241	.236	.214	.189	.127	.085	.036
08	.343	.344	.320	.294	.210	.148	.078
10	.427	.431	.401	.379	.267	.194	.112
12	.531	.539	.509	.473	.331	.243	.152
14	.634	.643	.612	.559	.399	.310	.217
16	.739	.766	.725	.647	.487	.396	.271
18	.854	.900	.845	.762	.564	.456	.294
20	.994	1.039	.965	.851	.625	.478	.296
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-0.317	-0.065	.194	.375	.459	.421	.321
-18	-0.284	-0.079	.171	.357	.449	.419	.318
-16	-0.260		.134	.312	.432	.413	.317
-14	-0.230	-0.079	.102	.263	.387	.406	.334
-12	-0.193	-0.070	.075	.225	.343	.360	.325
-10	-0.161	-0.062	.059	.201	.306	.324	.291
-08	-0.128	-0.053	.047	.162	.273	.289	.258
-06	-0.096	-0.040	.035	.122	.231	.253	.231
-04	-0.064	-0.027	.026	.089	.182	.210	.197
-02	-0.034	-0.016	.016	.056	.123	.160	.157
00	-0.002	-0.004	.004	.024	.068	.097	.115
02	.024	.010	-0.001	-0.002	.019	.045	.060
04	.058	.027	-0.009	-0.036	-0.032	-0.016	.009
06	.088	.038	-0.020	-0.065	-0.084	-0.073	-0.038
08	.122	.051	-0.031	-0.103	-0.142	-0.129	-0.083
10	.150	.061	-0.040	-0.138	-0.181	-0.171	-0.120
12	.183	.072	-0.054	-0.177	-0.226	-0.214	-0.164
14	.217	.079	-0.077	-0.215	-0.277	-0.278	-0.237
16	.246	.081	-0.109	-0.256	-0.347	-0.360	-0.296
18	.270	.080	-0.139	-0.311	-0.400	-0.410	-0.321
20	.302	.078	-0.170	-0.343	-0.439	-0.429	-0.323

TABLE 2.- AERODYNAMIC CHARACTERISTICS FOR WING 1  
CONTINUED

MACH NUMBER = 1.61	REYNOLDS NUMBER = 1.9 MILLION						FIXED TRANSITION
a, DEG	FRACTION OF SEMISPAN						
	.05	.20	.35	.50	.70	.825	.95
	SECTION NORMAL-FORCE COEFFICIENT						
-20	-1.124	-1.179	-1.089	-0.932	-0.648	-0.437	-0.291
-18	-0.951	-0.989	-0.970	-0.870	-0.630	-0.359	-0.285
-16	-0.838	-0.867	-0.869	-0.788	-0.602	-0.358	-0.296
-14	-0.714	-0.745	-0.743	-0.692	-0.534	-0.352	-0.313
-12	-0.607	-0.629	-0.648	-0.610	-0.479	-0.296	-0.298
-10	-0.512	-0.533	-0.560	-0.552	-0.441	-0.260	-0.268
-08	-0.411	-0.433	-0.462	-0.464	-0.399	-0.226	-0.245
-06	-0.311	-0.336	-0.365	-0.365	-0.341	-0.186	-0.217
-04	-0.213	-0.234	-0.263	-0.278	-0.271	-0.145	-0.191
-02	-0.116	-0.138	-0.164	-0.178	-0.189	-0.085	-0.153
00	-0.027	-0.045	-0.073	-0.088	-0.109	-0.121	-0.112
02	.058	.049	.023	.003	-0.029	-0.050	-0.057
04	.155	.151	.121	.103	.055	.020	.005
06	.247	.248	.215	.196	.136	.090	.039
08	.346	.347	.318	.294	.222	.151	.083
10	.435	.438	.407	.380	.285	.201	.118
12	.539	.540	.507	.476	.348	.252	.157
14	.635	.637	.611	.562	.408	.316	.221
16	.751	.752	.735	.656	.493	.406	.279
18	.873	.879	.858	.772	.573	.463	.302
20	1.031	1.060	.986	.864	.649	.544	.274
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-0.319	-0.065	.192	.377	.459	.402	.318
-18	-0.283	-0.072	.167	.355	.448	.348	.312
-16	-0.261	-0.075	.137	.316	.432	.348	.324
-14	-0.231	-0.078	.098	.267	.377	.346	.343
-12	-0.194	-0.075	.075	.226	.335	.291	.327
-10	-0.164	-0.067	.060	.204	.307	.257	.293
-08	-0.131	-0.053	.045	.163	.277	.225	.267
-06	-0.099	-0.041	.034	.123	.235	.188	.236
-04	-0.066	-0.028	.023	.091	.183	.151	.206
-02	-0.035	-0.015	.014	.057	.124	.096	.164
00	-0.005	-0.002	.006	.028	.072	.105	.119
02	.026	.011	-0.002	-0.002	.019	.044	.060
04	.059	.025	.011	-0.036	-0.036	-0.016	.005
06	.089	.037	.020	-0.067	-0.089	-0.078	-0.042
08	.123	.049	.030	-0.102	-0.151	-0.132	-0.088
10	.152	.061	.039	-0.136	-0.195	-0.177	-0.127
12	.186	.071	.053	-0.177	-0.240	-0.223	-0.170
14	.216	.079	.073	-0.216	-0.283	-0.283	-0.241
16	.248	.078	.106	-0.260	-0.350	-0.368	-0.304
18	.273	.073	.142	-0.314	-0.406	-0.416	-0.329
20	.311	.067	.168	-0.345	-0.456	-0.470	-0.299

TABLE 2.- AERODYNAMIC CHARACTERISTICS FOR WING 1  
CONTINUED

MACH NUMBER = 1.61 REYNOLDS NUMBER = 3.6 MILLION FREE TRANSITION

$\alpha$ , DEG	FRACTION OF SEMISPAN						
	.05	.20	.35	.50	.70	.825	.95
	SECTION NORMAL-FORCE COEFFICIENT						
-20	-1.083	-1.146	-1.067	-0.901	-0.631	-0.446	-0.282
-18	-0.943	-0.990	-0.958	-0.830	-0.602	-0.451	-0.286
-16	-0.822	-0.853	-0.859	-0.755	-0.564	-0.431	-0.291
-14	-0.696	-0.722	-0.738	-0.667	-0.510	-0.427	-0.305
-12	-0.603	-0.619	-0.644	-0.598	-0.465	-0.380	-0.282
-10	-0.497	-0.523	-0.546	-0.528	-0.425	-0.356	-0.261
-08	-0.399	-0.423	-0.452	-0.448	-0.387	-0.324	-0.239
-06	-0.305	-0.331	-0.358	-0.356	-0.333	-0.285	-0.214
-04	-0.206	-0.225	-0.262	-0.259	-0.255	-0.236	-0.183
-02	-0.115	-0.128	-0.165	-0.169	-0.176	-0.181	-0.146
00	-0.026	-0.040	-0.069	-0.080	-0.102	-0.114	-0.105
02	.060	.054	.027	.011	-0.021	-0.047	-0.053
04	.143	.144	.120	.102	.051	.017	-0.006
06	.237	.240	.217	.196	.133	.089	.036
08	.322	.327	.305	.281	.207	.140	.073
10	.419	.426	.400	.376	.272	.191	.110
12	.520	.525	.499	.473	.332	.238	.145
14	.620	.626	.603	.542	.395	.289	.190
16	.725	.734	.714	.626	.460	.376	.255
18	.839	.862	.820	.721	.545	.430	.290
20	.984	1.025	.953	.834	.612	.472	.293
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-0.318	-0.080	.189	.365	.446	.403	.309
-18	-0.286	-0.086	.153	.337	.430	.407	.313
-16	-0.263	-0.083	.127	.297	.404	.393	.318
-14	-0.226	-0.084	.094	.250	.357	.386	.335
-12	-0.195	-0.076	.073	.218	.323	.340	.308
-10	-0.160	-0.066	.056	.189	.294	.319	.285
-08	-0.127	-0.054	.043	.155	.269	.290	.260
-06	-0.097	-0.042	.033	.118	.230	.254	.232
-04	-0.065	-0.028	.024	.084	.171	.210	.198
-02	-0.034	-0.015	.015	.054	.115	.160	.157
00	-0.004	-0.002	.005	.025	.067	.099	.112
02	.027	.010	-0.003	-0.006	.014	.041	.056
04	.056	.024	-0.010	-0.036	-0.033	-0.013	.006
06	.087	.038	-0.019	-0.068	-0.088	-0.077	-0.039
08	.117	.049	-0.028	-0.097	-0.140	-0.122	-0.077
10	.149	.061	-0.038	-0.134	-0.186	-0.167	-0.118
12	.182	.074	-0.051	-0.177	-0.228	-0.209	-0.156
14	.216	.083	-0.069	-0.202	-0.274	-0.256	-0.207
16	.249	.087	-0.099	-0.241	-0.322	-0.342	-0.279
18	.274	.082	-0.126	-0.285	-0.386	-0.385	-0.316
20	.307	.079	-0.161	-0.335	-0.430	-0.423	-0.319

TABLE 2.- AERODYNAMIC CHARACTERISTICS FOR WING 1  
CONTINUED

MACH NUMBER = 1.61	REYNOLDS NUMBER = 3.6 MILLION						FIXED TRANSITION
$\alpha$ , DEG	FRACTION OF SEMISPAN						
	.05	.20	.35	.50	.70	.825	.95
SECTION NORMAL-FORCE COEFFICIENT							
-20	-1.106	-1.165	-1.071	-0.906	-0.641	-0.454	-0.288
-18	-0.949	-0.989	-0.956	-0.827	-0.601	-0.453	-0.285
-16	-0.823	-0.852	-0.859	-0.756	-0.557	-0.430	-0.289
-14	-0.707	-0.730	-0.764	-0.678	-0.506	-0.420	-0.298
-12	-0.605	-0.632	-0.653	-0.610	-0.471	-0.387	-0.282
-10	-0.502	-0.534	-0.556	-0.451	-0.392	-0.359	-0.267
-08	-0.405	-0.431	-0.458	-0.361	-0.339	-0.329	-0.245
-06	-0.313	-0.334	-0.364	-0.263	-0.257	-0.241	-0.186
-04	-0.212	-0.231	-0.261	-0.166	-0.174	-0.180	-0.150
-02	-0.116	-0.130	-0.160	-0.075	-0.097	-0.111	-0.104
00	-0.024	-0.038	-0.066	-0.017	-0.024	-0.051	-0.057
02	0.049	0.049	0.114	0.102	0.051	0.018	-0.006
04	0.142	0.147	0.217	0.195	0.132	0.087	0.035
06	0.236	0.242	0.307	0.285	0.209	0.143	0.073
08	0.326	0.332	0.384	0.384	0.277	0.197	0.113
10	0.428	0.441	0.410	0.467	0.333	0.245	0.148
12	0.522	0.541	0.507	0.547	0.398	0.298	0.195
14	0.625	0.643	0.617	0.623	0.458	0.370	0.254
16	0.712	0.729	0.707	0.722	0.545	0.428	0.259
18	0.844	0.879	0.822	0.827	0.607	0.467	0.297
20	0.966	0.969	0.939				
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-0.323	-0.079	0.189	0.368	0.454	0.410	0.316
-18	-0.288	-0.084	0.154	0.336	0.430	0.409	0.312
-16	-0.263	-0.089	0.128	0.298	0.401	0.392	0.317
-14	-0.228	-0.090	0.102	0.255	0.355	0.380	0.327
-12	-0.195	-0.079	0.073	0.224	0.327	0.346	0.308
-10	-0.161	-0.068	0.058	0.156	0.296	0.321	0.291
-08	-0.129	-0.054	0.044	0.156	0.272	0.294	0.267
-06	-0.100	-0.041	0.034	0.121	0.234	0.260	0.238
-04	-0.067	-0.027	0.024	0.085	0.172	0.214	0.201
-02	-0.034	-0.015	0.015	0.053	0.115	0.158	0.161
00	-0.004	-0.001	0.005	0.023	0.064	0.097	0.110
02	0.023	0.010	-0.001	-0.004	0.015	0.045	0.060
04	0.055	0.024	-0.010	-0.037	-0.033	-0.014	0.007
06	0.086	0.038	-0.020	-0.067	-0.087	-0.075	-0.038
08	0.117	0.050	-0.028	-0.099	-0.143	-0.125	-0.078
10	0.152	0.065	-0.039	-0.138	-0.190	-0.173	-0.121
12	0.183	0.076	-0.053	-0.170	-0.229	-0.216	-0.160
14	0.215	0.085	-0.074	-0.205	-0.277	-0.265	-0.213
16	0.241	0.090	-0.097	-0.240	-0.321	-0.336	-0.277
18	0.273	0.079	-0.127	-0.284	-0.385	-0.382	-0.278
20	0.302	0.072	-0.156	-0.333	-0.427	-0.416	-0.323

TABLE 2.—AERODYNAMIC CHARACTERISTICS FOR WING 1  
CONTINUED

MACH NUMBER = 2.01		REYNOLDS NUMBER = 1.7 MILLION						FREE TRANSITION	
α, DEG		FRACTION OF SEMISPAN							
		.05	.20	.35	.50	.70	.825		
SECTION NORMAL-FORCE COEFFICIENT									
-20	-.870	-.864	-.783	-.664	-.478	-.399	-.291		
-18	-.779	-.782	-.726	-.620	-.449	-.378	-.280		
-16	-.688	-.693	-.669	-.574	-.418	-.356	-.265		
-14	-.600	-.612	-.609	-.526	-.385	-.331	-.248		
-12	-.509	-.521	-.530	-.471	-.351	-.303			
-10	-.409	-.429	-.452	-.408	-.310	-.271	-.206		
-08	-.328	-.346	-.384	-.351	-.275	-.242	-.185		
-06	-.247	-.264	-.295	-.282	-.233	-.211	-.162		
-04	-.166	-.185	-.220	-.214	-.186	-.177	-.139		
-02	-.086	-.097	-.138	-.133	-.130	-.131	-.101		
00	-.021	-.032	-.057	-.074	-.086	-.091	-.082		
02	.049	.041	.021	-.010	-.028	-.043	-.049		
04	.127	.126	.102	.070	.032	.006	-.012		
06	.195	.194	.175	.139	.084	.049	.016		
08	.280	.281	.260	.214	.142	.095	.049		
10	.357	.354	.329	.275	.191	.134	.079		
12	.445	.441	.407	.337	.237	.171	.110		
14	.529	.527	.473	.402	.287	.196	.141		
16	.611	.602	.537	.455	.320	.223	.164		
18	.704	.689	.609	.511	.355	.253	.187		
20	.784	.760	.663	.555	.387	.278	.206		
SECTION PITCHING-MOMENT COEFFICIENT									
-20	-.284	-.076	.115	.253	.338	.363	.321		
-18	-.255	-.074	.104	.234	.316	.344	.308		
-16	-.226	-.072	.094	.215	.292	.323	.291		
-14	-.198	-.068	.084	.195	.268	.300	.272		
-12	-.169	-.062	.071	.173	.244	.273			
-10	-.135	-.051	.058	.149	.213	.243	.225		
-08	-.109	-.042	.047	.126	.189	.217	.201		
-06	-.080	-.032	.033	.100	.158	.188	.175		
-04	-.053	-.023	.022	.073	.126	.158	.149		
-02	-.027	-.013	.012	.043	.087	.116	.109		
00	-.004	-.004	.004	.024	.058	.080	.087		
02	.021	.005	-.004	.004	.019	.037	.052		
04	.049	.018	.013	-.025	-.022	-.006	.013		
06	.073	.027	-.021	-.051	-.057	-.043	-.017		
08	.102	.036	-.031	-.078	-.096	-.083	-.053		
10	.128	.047	-.041	-.099	-.129	-.117	-.085		
12	.157	.057	-.052	-.121	-.160	-.150	-.118		
14	.186	.064	-.060	-.148	-.195	-.170	-.152		
16	.210	.068	-.070	-.168	-.219	-.194	-.178		
18	.239	.072	-.082	-.190	-.244	-.222	-.203		
20	.264	.074	-.091	-.207	-.266	-.245	-.224		

TABLE 2.- AERODYNAMIC CHARACTERISTICS FOR WING 1  
CONTINUED

TABLE 2.- AERODYNAMIC CHARACTERISTICS FOR WING 1  
CONTINUED

MACH NUMBER = 2.01		REYNOLDS NUMBER = 3.1 MILLION					FREE TRANSITION
$\alpha$ , DEG		FRACTION OF SEMISPA					
		.05	.20	.35	.50	.70	.825
SECTION NORMAL-FORCE COEFFICIENT							
-20	-.758	-.770	-.716	-.612	-.476	-.383	-.283
-18	-.681	-.688	-.664	-.568	-.446	-.367	-.274
-16	-.590	-.599	-.598	-.519	-.419	-.348	-.265
-14	-.489	-.507	-.522	-.466	-.384	-.322	-.249
-12	-.416	-.437	-.458	-.415	-.346	-.292	-.229
-10	-.331	-.352	-.375	-.353	-.276	-.268	-.211
-08	-.291	-.312	-.332	-.319	-.255	-.223	-.189
-06	-.166	-.187	-.208	-.212	-.187	-.170	-.141
-04	-.095	-.116	-.136	-.143	-.140	-.132	-.114
00	-.022	-.030	-.059	-.071	-.084	-.088	-.084
02	.049	.042	.017	-.003	-.026	-.043	-.049
04	.120	.122	.093	.070	.032	.004	-.014
06	.199	.203	.179	.146	.089	.049	.016
08	.277	.279	.247	.215	.140	.091	.047
10	.362	.362	.333	.286	.195	.133	.076
12	.438	.441	.410	.349	.243	.170	.107
14	.517	.513	.472	.409	.281	.192	.130
16	.618	.620	.546	.470	.333	.237	.159
18	.705	.709	.614	.579	.366	.272	.188
20	.789	.779	.671	.570	.404	.294	.203
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-.200	-.041	.060	.287	.337	.346	.311
-18	-.248	-.076	.100	.230	.315	.332	.300
-16	-.224	-.074	.092	.212	.295	.314	.291
-14	-.193	-.070	.082	.192	.270	.289	.273
-12	-.161	-.062	.070	.172	.241	.262	.251
-10	-.137	-.054	.058	.152	.220	.239	.230
-08	-.109	-.045	.042	.128	.189	.210	.205
-06	-.094	-.040	.036	.114	.174	.198	.193
-04	-.053	-.023	.020	.073	.127	.150	.152
-02	-.029	-.014	.012	.047	.095	.116	.123
00	-.004	-.002	.004	.023	.056	.077	.090
02	.021	.008	-.003	.000	.017	.038	.053
04	.047	.019	-.011	-.025	-.022	-.003	.015
06	.074	.029	-.021	-.053	-.060	-.042	-.018
08	.101	.039	-.029	-.080	-.094	-.080	-.051
10	.131	.049	-.040	-.106	-.133	-.116	-.082
12	.155	.058	-.053	-.129	-.166	-.148	-.115
14	.182	.065	-.062	-.155	-.192	-.167	-.140
16	.215	.071	-.071	-.174	-.229	-.209	-.172
18	.242	.074	-.082	-.191	-.253	-.240	-.204
20	.267	.078	-.091	-.213	-.280	-.260	-.221

TABLE 2.- AERODYNAMIC CHARACTERISTICS FOR WING 1  
CONCLUDED

MACH NUMBER = 2.01		REYNOLDS NUMBER = 3.1 MILLION						FIXED TRANSITION
$\alpha$ , DEG		FRACTION OF SEMISPAN						
		.05	.20	.35	.50	.70	.825	
SECTION NORMAL-FORCE COEFFICIENT								
-20	-.869	-.879	-.792	-.676	-.559	-.391	-.282	
-18	-.771	-.792	-.745	-.628	-.466	-.373	-.269	
-16	-.675	-.686	-.671	-.575	-.437	-.356	-.261	
-14	-.587	-.602	-.605	-.527	-.408	-.335	-.248	
-12	-.500	-.518	-.538	-.476	-.374	-.312	-.234	
-10	-.410	-.431	-.450	-.416	-.334	-.279		
-08	-.331	-.355	-.375	-.354	-.294	-.249	-.192	
-06	-.241	-.268	-.290	-.278	-.244	-.214	-.168	
-04	-.172	-.190	-.222	-.212	-.197	-.179	-.145	
-02	-.095	-.116	-.139	-.140	-.143	-.139	-.118	
00	-.023	-.035	-.063	-.072	-.086	-.095	-.086	
02	.048	.042	.012	.010	-.026	-.046	-.051	
04	.125	.124	.092	.074	.032	.004	-.015	
06	.196	.199	.173	.144	.084	.046	.014	
08	.274	.278	.249	.215	.139	.091	.045	
10	.351	.352	.324	.278	.186	.132	.074	
12	.438	.440	.402	.346	.239	.174	.107	
14	.524	.517	.479	.405	.283	.210	.133	
16	.601	.594	.544	.459	.327	.243	.157	
18	.688	.677	.609	.514	.370	.277	.184	
20	.778	.762	.671	.561	.405	.305	.204	
SECTION PITCHING-MOMENT COEFFICIENT								
-20	-.284	-.079	.114	.258	.389	.353	.311	
-18	-.253	-.074	.105	.236	.328	.336	.295	
-16	-.222	-.076	.092	.213	.307	.320	.287	
-14	-.193	-.069	.082	.195	.285	.301	.271	
-12	-.165	-.062	.071	.176	.261	.280	.256	
-10	-.136	-.053	.053	.153	.231	.249		
-08	-.109	-.044	.042	.128	.202	.222	.208	
-06	-.078	-.032	.031	.098	.167	.190	.182	
-04	-.055	-.023	.023	.072	.135	.158	.157	
-02	-.029	-.012	.013	.046	.097	.123	.128	
00	-.005	-.003	.004	.022	.058	.084	.093	
02	.021	.007	-.003	-.010	.017	.041	.055	
04	.048	.020	.011	-.027	-.022	-.003	.016	
06	.073	.029	.021	-.053	-.057	-.040	-.015	
08	.100	.039	.029	-.080	-.094	-.079	-.048	
10	.127	.049	.039	-.103	-.126	-.115	-.079	
12	.155	.059	.050	-.129	-.163	-.152	-.115	
14	.185	.066	.063	-.151	-.193	-.184	-.144	
16	.209	.070	.074	-.172	-.225	-.214	-.170	
18	.236	.077	.082	-.192	-.255	-.245	-.200	
20	.265	.078	.092	-.209	-.281	-.271	-.221	

TABLE 3.- AERODYNAMIC CHARACTERISTICS FOR WING 2

MACH NUMBER = 1.61		REYNOLDS NUMBER = 1.9 MILLION					FREE TRANSITION	
$\alpha$ , DEG		FRACTION OF SEMISPAN						
		.05	.20	.35	.50	.70	.825	
SECTION NORMAL-FORCE COEFFICIENT								
-20	-.063	-.152	-1.140	-.902	-.659	-.473	-.281	
-18	-.945	-.015	-1.024	-.836	-.637	-.470	-.279	
-16	-.819	-.868	-.921	-.745	-.603	-.462	-.289	
-14	-.706	-.747	-.819	-.668	-.532	-.441	-.301	
-12	-.604	-.642	-.718	-.601	-.485	-.390	-.276	
-10	-.505	-.544	-.605	-.536	-.448	-.366	-.255	
-08	-.393	-.430	-.485	-.432	-.395	-.332	-.241	
-06	-.306	-.334	-.381	-.344	-.338	-.295	-.220	
-04	-.204	-.227	-.263	-.242	-.252	-.253	-.187	
-02	-.111	-.129	-.157	-.149	-.164	-.172	-.149	
00	-.019	-.026	-.060	-.052	-.081	-.098	-.100	
02	.063	.064	.057	.033	-.003	-.031	-.045	
04	.164	.167	.154	.134	.081	.041	.005	
06	.259	.268	.286	.227	.168	.110	.049	
08	.347	.367	.390	.320	.236	.164	.088	
10	.444	.463	.458	.410	.297	.213	.125	
12	.551	.577	.597	.495	.354	.261	.163	
14	.647	.672	.720	.574	.413	.323	.223	
16	.759	.786	.814	.657	.485	.399	.271	
18	.885	.921	.919	.760	.573	.446	.280	
20	1.025	1.066	1.060	.856	.631	.457	.259	
SECTION PITCHING-MOMENT COEFFICIENT								
-20	-.309	-.067	.168	.369	.468	.427	.307	
-18	-.286	-.075	.149	.346	.455	.424	.306	
-16	-.259	-.079	.121	.300	.434	.419	.317	
-14	-.226	-.083	.095	.259	.378	.403	.330	
-12	-.194	-.077	.074	.224	.340	.352	.303	
-10	-.161	-.068	.056	.197	.311	.329	.279	
-08	-.125	-.054	.041	.151	.274	.296	.262	
-06	-.097	-.042	.031	.116	.233	.262	.239	
-04	-.065	-.028	.021	.079	.170	.225	.201	
-02	-.035	-.013	.014	.048	.109	.150	.160	
00	-.003	.000	.011	.016	.054	.084	.106	
02	.023	.011	-.001	-.013	.002	.027	.047	
04	.056	.025	-.011	-.048	-.053	-.035	-.006	
06	.086	.038	-.017	-.081	-.112	-.096	-.053	
08	.115	.051	-.025	-.116	-.161	-.144	-.094	
10	.146	.064	-.047	-.155	-.202	-.188	-.135	
12	.179	.077	-.050	-.189	-.243	-.231	-.176	
14	.209	.085	-.093	-.224	-.286	-.290	-.244	
16	.241	.088	-.097	-.262	-.340	-.361	-.295	
18	.271	.083	-.122	-.310	-.404	-.400	-.305	
20	.302	.079	-.160	-.349	-.441	-.409	-.283	

TABLE 3.- AERODYNAMIC CHARACTERISTICS FOR WING 2  
CONTINUED

MACH NUMBER = 1.61 REYNOLDS NUMBER = 1.9 MILLION FIXED TRANSITION

$\alpha$ , DEG	FRACTION OF SEMISSPAN						
	.05	.20	.35	.50	.70	.825	.95
	SECTION NORMAL-FORCE COEFFICIENT						
-20	-1.069	-1.155	-1.142	-0.905	-0.661	-0.477	-0.283
-18	-0.932	-1.008	-1.032	-0.837	-0.644	-0.468	-0.282
-16	-0.810	-0.872	-0.920	-0.742	-0.607	-0.466	-0.297
-14	-0.681	-0.723	-0.804	-0.665	-0.532	-0.447	-0.311
-12	-0.585	-0.619	-0.696	-0.606	-0.495	-0.403	-0.288
-10	-0.487	-0.520	-0.583	-0.528	-0.450	-0.372	-0.262
-08				-0.426	-0.398	-0.337	-0.246
-06	-0.279	-0.315	-0.367	-0.335	-0.331	-0.291	-0.218
-04	-0.189	-0.208	-0.256	-0.234	-0.244	-0.239	-0.185
-02	-0.100	-0.112	-0.146	-0.139	-0.162	-0.167	-0.147
00	-0.001	-0.016	-0.037	-0.048	-0.078	-0.098	-0.096
02	.085	.076	.077	.049	.004	-.026	-.038
04	.184	.175	.182	.139	.083	.050	.009
06	.263	.275	.290	.232	.169	.114	.052
08	.368	.376	.407	.327	.253	.171	.094
10	.463	.481	.502	.417	.313	.224	.132
12	.562	.582	.599	.503	.355	.268	.152
14	.661	.677	.711	.576	.412	.333	.230
16	.772	.796	.855	.668	.514	.406	.285
18	.893	.937	.935	.770	.581	.448	.273
20	1.044	1.092	1.083	.863	.646	.457	.254
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-0.311	-0.065	.166	.371	.469	.431	.310
-18	-0.282	-0.076	.151	.347	.460	.422	.309
-16	-0.256	-0.082	.120	.298	.437	.423	.325
-14	-0.218	-0.087	.090	.258	.377	.408	.341
-12	-0.187	-0.075	.067	.231	.347	.364	.316
-10	-0.155	-0.065	.050	.195	.314	.334	.286
-08				.149	.276	.301	.267
-06	-0.089	-0.038	.028	.115	.227	.259	.236
-04	-0.060	-0.023	.020	.078	.163	.212	.199
-02	-0.031	-0.013	.012	.045	.107	.145	.157
00	.000	-0.001	.002	.015	.052	.085	.101
02	.030	.012	-.004	-.019	-.003	.023	.040
04	.062	.026	-.012	-.049	-.054	-.043	-.010
06	.087	.038	-.019	-.082	-.114	-.100	-.056
08	.121	.052	-.028	-.117	-.174	-.151	-.102
10	.151	.062	-.037	-.154	-.216	-.199	-.143
12	.182	.075	-.049	-.192	-.244	-.238	-.167
14	.213	.085	-.069	-.224	-.283	-.300	-.251
16	.243	.087	-.106	-.266	-.363	-.366	-.310
18	.272	.082	-.125	-.313	-.409	-.402	-.296
20	.308	.077	-.165	-.350	-.452	-.409	-.278

TABLE 3.—AERODYNAMIC CHARACTERISTICS FOR WING 2  
CONTINUED

MACH NUMBER = 1.61		REYNOLDS NUMBER = 3.6 MILLION					FREE TRANSITION	
$\alpha$ , DEG		FRACTION OF SEMISPAN						
		.05	.20	.35	.50	.70	.825	
SECTION NORMAL-FORCE COEFFICIENT								
-20	-1.041	-1.091	-1.112	.758	.651	.467	.281	
-18	-.907	-.954	-1.000	-.808	-.621	-.463	-.286	
-16	-.796	-.838	-.908	-.720	-.578	-.464	-.300	
-14	-.681	-.721	-.794	-.651	-.514	-.419	-.298	
-12	-.577	-.613	-.683	-.584	-.478	-.391	-.278	
-10	-.478	-.513	-.571	-.508	-.434	-.361	-.262	
-08	-.376	-.406	-.454	-.411	-.379	-.321	-.238	
-06	-.286	-.317	-.353	-.322	-.322	-.281	-.212	
-04	-.184	-.208	-.242	-.225	-.231	-.227	-.177	
-02	-.099	-.118	-.143	-.139	-.156	-.160	-.143	
00	.008	.000	-.023	-.027	-.061	-.081	-.083	
02	.086	.092	.079	.056	.010	-.017	-.036	
04	.181	.187	.168	.146	.091	.051	.013	
06	.272	.279	.287	.233	.173	.114	.052	
08	.362	.381	.392	.325	.246	.169	.092	
10	.467	.478	.508	.428	.306	.216	.129	
12	.567	.586	.613	.509	.366	.263	.164	
14	.659	.675	.707	.573	.420	.307	.204	
16	.759	.783	.822	.646	.469	.381	.266	
18	.880	.912	.925	.735	.553	.431	.286	
20	1.027	1.067	1.042	.838	.626	.456	.257	
SECTION PITCHING-MOMENT COEFFICIENT								
-20	-.308	-.079	.163	.276	.462	.422	.307	
-18	-.280	-.086	.136	.331	.446	.419	.314	
-16	-.254	-.091	.115	.282	.413	.423	.329	
-14	-.220	-.091	.087	.247	.360	.378	.327	
-12	-.187	-.080	.064	.215	.333	.352	.304	
-10	-.154	-.067	.048	.184	.302	.323	.286	
-08	-.120	-.053	.034	.142	.262	.287	.259	
-06	-.091	-.041	.026	.108	.222	.250	.230	
-04	-.059	-.026	.017	.074	.153	.201	.190	
-02	-.031	-.014	.011	.045	.103	.138	.153	
00	.003	.002	.002	.007	.040	.070	.087	
02	.030	.012	-.005	-.021	-.006	.015	.037	
04	.061	.025	-.013	-.052	-.059	-.044	-.014	
06	.089	.038	-.017	-.083	-.117	-.101	-.055	
08	.119	.053	-.025	-.116	-.169	-.149	-.099	
10	.152	.063	-.037	-.161	-.211	-.191	-.139	
12	.186	.077	-.050	-.196	-.253	-.233	-.178	
14	.214	.087	-.065	-.221	-.293	-.274	-.222	
16	.245	.093	-.092	-.254	-.327	-.345	-.290	
18	.273	.093	-.119	-.294	-.390	-.385	-.309	
20	.309	.081	-.148	-.339	-.439	-.409	-.281	

TABLE 3.— AERODYNAMIC CHARACTERISTICS FOR WING 2  
CONTINUED

MACH NUMBER = 1.61		REYNOLDS NUMBER = 3.6 MILLION					FIXED TRANSITION
$\alpha$ , DEG		FRACTION OF SEMISPAN					
		.05	.20	.35	.50	.70	.825
SECTION NORMAL-FORCE COEFFICIENT							
-20	-1.050	-1.106	-1.127	-0.881	-0.656	-0.468	-0.286
-18	-0.914	-0.957	-1.020	-0.812	-0.620	-0.461	-0.286
-16	-0.788	-0.824	-0.916	-0.717	-0.580	-0.467	-0.303
-14	-0.678	-0.706	-0.793	-0.652	-0.516	-0.424	-0.304
-12	-0.573	-0.612	-0.676	-0.584	-0.477	-0.395	-0.282
-10	-0.478	-0.505	-0.574	-0.506	-0.435	-0.361	-0.264
-08	-0.374	-0.401	-0.463	-0.410	-0.380	-0.321	-0.239
-06	-0.280	-0.303	-0.356	-0.318	-0.315	-0.277	-0.211
-04	-0.183	-0.201	-0.237	-0.220	-0.227	-0.224	-0.177
-02	-0.090	-0.105	-0.142	-0.131	-0.152	-0.154	-0.141
00	.000	-0.010	-0.033	-0.038	-0.072	-0.089	-0.087
02	.079	.081	.063	.045	.003	-0.024	-0.039
04	.171	.181	.176	.167	.082	.047	.010
06	.264	.268	.281	.226	.167	.109	.049
08	.359	.373	.392	.319	.241	.168	.089
10	.456	.481	.504	.412	.305	.218	.125
12	.555	.575	.600	.489	.358	.261	.160
14	.657	.679	.717	.565	.410	.312	.207
16	.753	.776	.817	.639	.470	.375	.266
18	.874	.889	.922	.730	.549	.428	.284
20	1.018	1.060	1.053	.837	.623	.450	.255
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-0.311	-0.079	.167	.363	.465	.423	.313
-18	-0.280	-0.086	.141	.333	.444	.417	.313
-16	-0.252	-0.091	.116	.281	.415	.426	.332
-14	-0.219	-0.086	.085	.248	.362	.384	.335
-12	-0.186	-0.079	.062	.217	.332	.355	.308
-10	-0.154	-0.066	.049	.184	.302	.323	.288
-08	-0.120	-0.052	.036	.143	.263	.287	.260
-06	-0.089	-0.038	.027	.108	.216	.247	.229
-04	-0.058	-0.025	.017	.074	.150	.198	.191
-02	-0.029	-0.013	.011	.043	.100	.132	.151
00	.001	.000	.002	.011	.047	.077	.092
02	.028	.013	-0.003	-0.017	-0.003	.021	.041
04	.059	.026	-0.011	-0.017	-0.053	-0.040	-0.011
06	.088	.038	-0.017	-0.080	-0.112	-0.096	-0.052
08	.118	.051	-0.025	-0.113	-0.165	-0.149	-0.095
10	.150	.066	-0.037	-0.151	-0.210	-0.194	-0.135
12	.182	.075	-0.049	-0.183	-0.247	-0.232	-0.173
14	.215	.085	-0.069	-0.215	-0.284	-0.280	-0.226
16	.244	.090	-0.094	-0.249	-0.327	-0.339	-0.290
18	.272	.093	-0.121	-0.291	-0.387	-0.383	-0.307
20	.306	.087	-0.150	-0.338	-0.437	-0.403	-0.279

TABLE 3--AERODYNAMIC CHARACTERISTICS FOR WING 2  
CONTINUED

MACH NUMBER = 2.01	REYNOLDS NUMBER = 1.7 MILLION						FREE TRANSITION
a, DEG	FRACTION OF SEMISPA						
	.05	.20	.35	.50	.70	.825	.95
	SECTION NORMAL-FORCE COEFFICIENT						
-20							
-18							
-16	-0.622	-0.622	-0.529	-0.538	-0.418	-0.342	-0.246
-14							
-12	-0.456	-0.485	-0.414	-0.437	-0.352	-0.294	-0.212
-10	-0.365	-0.395	-0.327	-0.375	-0.309	-0.262	-0.194
-08	-0.183	-0.300	-0.239	-0.320	-0.267	-0.231	-0.173
-06	-0.175	-0.181	-0.170	-0.253	-0.221	-0.199	-0.152
-04	-0.086	-0.066	-0.073	-0.185	-0.170	-0.162	-0.125
-02							
00	-0.011	0.001	0.004	-0.060	-0.069	-0.082	-0.074
02		0.057	0.071	0.006	-0.015	-0.039	-0.043
04	0.117	0.133	0.146	0.080	0.044	0.010	-0.010
06	0.202	0.213	0.226	0.154	0.102	0.055	0.023
08	0.284	0.295	0.310	0.214	0.155	0.099	0.054
10	0.352	0.369	0.378	0.284	0.197	0.137	0.083
12	0.438	0.458	0.452	0.346	0.244	0.176	0.113
14							
16	0.592	0.605	0.557	0.439	0.318	0.233	0.157
18							
20	0.831	0.791	0.718	0.571	0.414	0.307	0.211
SECTION PITCHING-MOMENT COEFFICIENT							
-20							
-18							
-16	-0.206	-0.062	0.062	0.209	0.292	0.308	0.270
-14							
-12	-0.154	-0.058	0.044	0.167	0.244	0.263	0.231
-10	-0.123	-0.049	0.029	0.144	0.212	0.233	0.211
-08	-0.047	-0.047	0.014	0.126	0.182	0.205	0.188
-06	-0.062	-0.044	0.004	0.100	0.150	0.176	0.164
-04	-0.034	-0.028	-0.010	0.077	0.114	0.142	0.134
-02							
00	-0.004	0.001	-0.005	0.026	0.046	0.071	0.078
02		0.009	-0.010	0.003	0.010	0.034	0.045
04	0.040	0.020	-0.017	-0.023	-0.029	-0.009	0.010
06	0.069	0.031	-0.027	-0.051	-0.069	-0.048	-0.025
08	0.097	0.044	-0.038	-0.070	-0.105	-0.086	-0.058
10	0.119	0.051	-0.048	-0.098	-0.134	-0.120	-0.089
12	0.146	0.056	-0.059	-0.121	-0.165	-0.154	-0.122
14							
16	0.194	0.068	-0.073	-0.155	-0.218	-0.205	-0.170
18							
20	0.269	0.069	-0.103	-0.208	-0.288	-0.273	-0.230

TABLE 3.- AERODYNAMIC CHARACTERISTICS FOR WING 2  
CONTINUED

MACH NUMBER = 2.01		REYNOLDS NUMBER = 1.7 MILLION					FIXED TRANSITION
$\alpha$ , DEG		FRACTION OF SEMISPAN					
		.05	.20	.35	.50	.70	.825
SECTION NORMAL-FORCE COEFFICIENT							
-20							
-18							
-16	-0.636	-0.457	-0.560	-0.512	-0.418	-0.341	-0.247
-14							
-12	-0.489	-0.362	-0.466	-0.435	-0.359	-0.297	-0.216
-10	-0.415	-0.313	-0.417	-0.392	-0.328	-0.274	-0.202
-08	-0.337	-0.270	-0.365	-0.335	-0.285	-0.246	-0.184
-06	-0.258	-0.219	-0.308	-0.274	-0.238	-0.213	-0.165
-04	-0.179	-0.165	-0.229	-0.201	-0.186	-0.174	-0.140
-02							
00	-0.030	-0.031	-0.070	-0.059	-0.081	-0.085	-0.078
02							
04	0.125	0.130	0.079	0.086	0.048	0.016	-0.007
06	0.198	0.195	0.135	0.159	0.105	0.060	0.024
08	0.276	0.265	0.201	0.226	0.158	0.105	0.058
10	0.351	0.335	0.260	0.286	0.202	0.143	0.086
12	0.439	0.414	0.308	0.346	0.249	0.179	0.114
14							
16	0.591	0.542	0.417	0.446	0.326	0.241	0.159
18							
20							
SECTION PITCHING-MOMENT COEFFICIENT							
-20							
-16	-0.210	-0.055	0.073	0.196	0.271	0.306	0.271
-14							
-12	-0.165	-0.050	0.058	0.163	0.226	0.266	0.236
-10	-0.139	-0.047	0.052	0.145	0.204	0.245	0.220
-08	-0.114	-0.042	0.047	0.123	0.175	0.218	0.200
-06	-0.087	-0.035	0.040	0.099	0.145	0.188	0.179
-04	-0.061	-0.027	0.031	0.071	0.112	0.153	0.151
-02							
00	-0.009	-0.006	0.011	0.021	0.047	0.075	0.084
02							
04	0.042	0.018	0.002	-0.027	-0.031	-0.013	0.007
06	0.067	0.029	-0.003	-0.055	-0.066	-0.053	-0.026
08	0.093	0.041	-0.012	-0.079	-0.098	-0.092	-0.063
10	0.118	0.051	-0.021	-0.101	-0.123	-0.126	-0.092
12	0.145	0.059	-0.025	-0.125	-0.151	-0.157	-0.123
14							
16	0.196	0.072	-0.040	-0.163	-0.198	-0.213	-0.173
18							
20							

TABLE 3.— AERODYNAMIC CHARACTERISTICS FOR WING 2  
CONTINUED

MACH NUMBER = 2.01		REYNOLDS NUMBER = 3.1 MILLION						FREE TRANSITION	
$\alpha$ , DEG		FRACTION OF SEMISPAN							
		.05	.20	.35	.50	.70	.825	.95	
		SECTION NORMAL-FORCE COEFFICIENT							
-20	-.807	-.790	-.693	-.643	-.489	-.393	-.279		
-18	-.616	-.624	-.614	-.537	-.420	-.343	-.247		
-16	-.449	-.463	-.433	-.432	-.349	-.291	-.214		
-14									
-12	-.284	-.316	-.284	-.313	-.265	-.230	-.173		
-10									
-8	-.027	-.037	-.031	-.055	-.070	-.083	-.077		
-6									
-4	-.112	-.128	-.122	-.180	-.173	-.160	-.127		
-2									
00									
02	.123	.131	.135	.085	.044	.011	-.011		
04									
06									
08	.282	.283	.286	.228	.153	.100	.054		
10									
12	.461	.467	.453	.359	.255	.182	.118		
14									
16	.613	.609	.569	.454	.325	.240	.162		
18									
20	.786	.889	.682	.555	.397	.296	.202		
SECTION PITCHING-MOMENT COEFFICIENT									
-20	-.260	-.080	.092	.251	.344	.355	.307		
-18	-.201	-.073	.084	.207	.292	.308	.270		
-16	-.149	-.060	.047	.164	.241	.260	.234		
-14									
-12	-.097	-.052	.024	.117	.180	.204	.188		
-10									
-8	-.042	-.026	.001	.068	.116	.141	.137		
-6									
-4	-.007	-.001	.005	.021	.047	.072	.083		
-2									
00									
02	.042	.021	-.014	-.027	-.030	-.009	.011		
04									
06									
08	.095	.039	-.031	-.080	-.104	-.087	-.058		
10									
12	.152	.058	-.057	-.128	-.174	-.160	-.127		
14									
16	.201	.071	-.075	-.164	-.223	-.212	-.176		
18									
20	.256	.132	-.093	-.206	-.275	-.264	-.221		

TABLE 3.- AERODYNAMIC CHARACTERISTICS FOR WING 2  
CONCLUDED

MACH NUMBER = 2.01	REYNOLDS NUMBER = 3.1 MILLION						FIXED TRANSITION
$\alpha$ , DEG	FRACTION OF SEMISPAN						
	.05	.20	.35	.50	.70	.825	.95
	SECTION NORMAL-FORCE COEFFICIENT						
-20							
-18							
-16	-0.612	-0.578	-0.573	-0.521	-0.426	-0.348	-0.253
-14	-0.430	-0.417	-0.439	-0.416	-0.348	-0.295	-0.218
-12	-0.244	-0.243	-0.280	-0.291	-0.269	-0.230	-0.175
-10	-0.044	-0.053	-0.102	-0.142	-0.167	-0.152	
-08	0.001	0.000	-0.031	-0.035	-0.063	-0.078	-0.074
-06	0.116	0.116	0.086	0.089	0.044	0.011	-0.010
-04	0.265	0.266	0.225	0.225	0.149	0.099	0.053
-02	0.422	0.425	0.356	0.348	0.244	0.175	0.109
00	0.592	0.570	0.458	0.453	0.331	0.242	
02	0.785	0.718	0.579	0.559	0.406	0.307	0.206
SECTION PITCHING-MOMENT COEFFICIENT							
-20							
-18							
-16	-0.201	-0.065	0.071	0.196	0.274	0.313	0.278
-14	-0.145	-0.059	0.048	0.156	0.219	0.263	0.238
-12	-0.087	-0.043	0.020	0.108	0.166	0.204	0.190
-10	-0.023	-0.026	-0.006	0.051	0.100	0.134	
-08	0.000	0.000	0.003	0.012	0.037	0.068	0.079
-06	0.040	0.019	-0.003	-0.031	-0.028	-0.010	0.010
-04	0.090	0.042	-0.019	-0.082	-0.092	-0.087	-0.058
-02	0.141	0.059	-0.036	-0.128	-0.150	-0.154	-0.118
00	0.195	0.073	-0.051	-0.167	-0.205	-0.215	
02	0.255	0.084	-0.072	-0.209	-0.250	-0.274	-0.225

TABLE 4.- AERODYNAMIC CHARACTERISTICS FOR WING 3

MACH NUMBER = 1.61		REYNOLDS NUMBER = 1.9 MILLION		FREE TRANSITION			
$\alpha$ , DEG		FRACTION OF SEMISPAN					
		.05	.20	.35	.50	.70	.825
SECTION NORMAL-FORCE COEFFICIENT							
-20	-1.054	-1.159	-1.056	-0.914	-0.623	-0.458	-0.283
-18	-0.761	-0.838	-0.859	-0.766	-0.574	-0.441	-0.287
-16	-0.569	-0.607	-0.607	-0.572	-0.454	-0.395	-0.294
-14	-0.476	-0.504	-0.518	-0.503	-0.385	-0.335	-0.273
-12	-0.377	-0.396	-0.418	-0.411	-0.339	-0.283	-0.228
-10	-0.284	-0.299	-0.322	-0.318	-0.298	-0.248	-0.202
-08	-0.193	-0.205	-0.220	-0.222	-0.225	-0.202	-0.171
-06	-0.096	-0.099	-0.120	-0.125	-0.134	-0.144	-0.134
-04	-0.009	-0.010	-0.024	-0.035	-0.059	-0.080	-0.083
00	.080	.087	.075	.058	.020	.013	.033
02	.174	.185	.173	.155	.103	.060	.014
04	.270	.287	.274	.255	.188	.127	.061
06	.361	.390	.377	.351	.254	.179	.103
08	.456	.484	.480	.451	.306	.220	.139
10	.563	.563	.574	.536	.344	.252	.183
12	.737	.748	.763	.694	.466	.373	.255
14	1.011	1.041	1.032	0.863	0.567	0.397	0.232
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-0.277	-0.064	.182	.361	.440	.414	.310
-18	-0.237	-0.071	.145	.311	.406	.398	.314
-16	-0.186	-0.075	.068	.210	.323	.362	.324
-14	-0.157	-0.063	.054	.182	.264	.305	.300
-12	-0.126	-0.050	.041	.143	.231	.254	.248
-10	-0.096	-0.038	.031	.108	.203	.222	.218
-08	-0.067	-0.025	.022	.075	.150	.180	.183
-06	-0.035	-0.011	.013	.042	.087	.125	.144
-04	-0.003	-0.000	.004	.013	.038	.070	.087
00	.027	.013	-.005	-.017	-.013	.012	.035
02	.060	.027	-.013	-.049	-.066	-.051	-.014
04	.092	.041	-.022	-.084	-.126	-.111	-.064
06	.120	.054	-.032	-.118	-.173	-.157	-.110
08	.151	.064	-.045	-.162	-.210	-.194	-.150
10	.183	.063	-.058	-.199	-.237	-.224	-.200
12	.236	.069	-.101	-.278	-.335	-.335	-.277
14	.284	.047	-.187	-.343	-.397	-.355	-.252

TABLE 4.— AERODYNAMIC CHARACTERISTICS FOR WING 3  
CONTINUED

MACH NUMBER = 1.61 REYNOLDS NUMBER = 1.9 MILLION FIXED TRANSITION

$\alpha$ , DEG	FRACTION OF SEMISPAN						
	.05	.20	.35	.50	.70	.825	.95
	SECTION NORMAL-FORCE COEFFICIENT						
-20	-1.060	-1.161	-1.069	-0.927	-0.646	-0.458	-0.281
-18	-0.778	-0.850	-0.874	-0.788	-0.604	-0.432	-0.282
-16	-0.570	-0.600	-0.628	-0.593	-0.496	-0.420	-0.312
-14	-0.469	-0.501	-0.523	-0.512	-0.421	-0.354	-0.279
-12	-0.371	-0.393	-0.422	-0.408	-0.369	-0.307	-0.230
-10	-0.283	-0.297	-0.323	-0.318	-0.309	-0.270	-0.207
-08	-0.189	-0.199	-0.226	-0.223	-0.223	-0.220	-0.174
-06	-0.094	-0.097	-0.123	-0.126	-0.139	-0.142	-0.133
00	-0.006	-0.004	-0.020	-0.033	-0.058	-0.079	-0.081
02	.079	.083	.071	.056	.018	-.017	-.034
04	.173	.185	.171	.157	.104	.062	.016
06	.265	.282	.279	.251	.195	.132	.061
08	.362	.382	.383	.346	.274	.187	.104
10	.455	.481	.475	.444	.333	.234	.140
12	.549	.569	.580	.532	.386	.276	.191
14							
16	.735	.747	.757	.692	.507	.403	.268
18							
20	1.004	1.059	1.035	0.862	0.600	0.401	0.230
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-0.278	-0.065	.183	.367	.457	.413	.307
-18	-0.243	-0.069	.150	.323	.427	.390	.309
-16	-0.185	-0.076	.072	.224	.356	.383	.341
-14	-0.155	-0.063	.054	.187	.292	.320	.307
-12	-0.123	-0.050	.043	.143	.255	.275	.251
-10	-0.095	-0.037	.031	.109	.211	.241	.224
-08	-0.065	-0.024	.023	.076	.148	.194	.188
-06	-0.034	-0.011	.015	.043	.092	.122	.143
00	-0.002	.002	.004	.013	.038	.068	.086
02	.026	.013	-.004	-.017	-.012	.015	.036
04	.059	.027	-.013	-.051	-.067	-.053	-.017
06	.089	.040	-.023	-.082	-.130	-.116	.065
08	.120	.052	-.033	-.117	-.188	-.165	-.112
10	.150	.063	-.045	-.158	-.229	-.206	-.151
12	.179	.064	-.062	-.197	-.267	-.243	-.208
14							
16	.236	.071	-.099	-.277	-.359	-.361	-.291
18							
20	.278	.054	-.188	-.343	-.419	-.359	-.251

TABLE 4.—AERODYNAMIC CHARACTERISTICS FOR WING 3  
CONTINUED

MACH NUMBER = 1.61	REYNOLDS NUMBER = 3.6 MILLION						FREE TRANSITION
α, DEG	FRACTION OF SEMISPAN						
	.05	.20	.35	.50	.70	.825	.95
	SECTION NORMAL-FORCE COEFFICIENT						
-20	-1.016	-1.106	-1.029	-0.881	-0.624	-0.448	-0.284
-18	-0.756	-0.803	-0.805	-0.747	-0.585	-0.476	-0.325
-16	-0.552	-0.597	-0.599	-0.566	-0.451	-0.373	-0.295
-14	-0.367	-0.395	-0.412	-0.401	-0.355	-0.303	-0.227
-12	-0.178	-0.192	-0.212	-0.214	-0.212	-0.211	-0.166
-10	0.008	0.000	0.011	0.024	0.046	0.066	0.072
-08	0.169	0.180	0.171	0.151	0.102	0.059	0.015
-06	0.356	0.381	0.369	0.342	0.261	0.180	0.096
-04	0.551	0.586	0.562	0.527	0.372	0.268	0.164
-02	0.747	0.763	0.753	0.650	0.473	0.377	0.259
00	0.987	1.038	0.991	0.841	0.599	0.404	0.225
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-0.292	-0.068	0.180	0.355	0.441	0.404	0.311
-18	-0.245	-0.095	0.116	0.301	0.419	0.431	0.356
-16	-0.183	-0.078	0.066	0.210	0.315	0.338	0.324
-14	-0.125	-0.053	0.039	0.139	0.244	0.271	0.247
-12	-0.064	-0.027	0.020	0.071	0.139	0.186	0.179
-10	0.000	0.000	0.002	0.009	0.030	0.057	0.076
-08	0.056	0.026	0.013	0.048	0.065	0.051	0.016
-06	0.118	0.054	0.030	0.115	0.178	0.159	0.103
-04	0.179	0.075	0.055	0.195	0.257	0.237	0.177
-02	0.242	0.092	0.095	0.244	0.335	0.341	0.281
00	0.305	0.072	0.174	0.339	0.419	0.361	0.245

TABLE 4.- AERODYNAMIC CHARACTERISTICS FOR WING 3  
CONTINUED

MACH NUMBER = 1.61	REYNOLDS NUMBER = 3.6 MILLION						FIXED TRANSITION
$\alpha$ , DEG	FRACTION OF SEMISPAN						
	.05	.20	.35	.50	.70	.825	.95
SECTION NORMAL-FORCE COEFFICIENT							
-20	-1.035	-1.116	-1.050	-0.881	-0.627	-0.447	-0.288
-18	-0.757	-0.801	-0.815	-0.754	-0.606	-0.492	-0.333
-16	-0.556	-0.599	-0.601	-0.569	-0.460	-0.389	-0.300
-14	-0.366	-0.394	-0.409	-0.402	-0.358	-0.304	-0.229
-12	-0.177	-0.191	-0.210	-0.212	-0.210	-0.210	-0.166
-10	-0.002	-0.008	-0.022	-0.033	-0.055	-0.078	-0.079
-08	0.174	0.183	0.173	0.153	0.101	0.058	0.013
-06	0.354	0.379	0.366	0.338	0.257	0.178	0.094
-04	0.552	0.588	0.565	0.515	0.380	0.275	0.166
-02	0.754	0.778	0.754	0.651	0.492	0.391	0.270
00	0.994	1.053	0.990	0.838	0.610	0.405	0.227
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-0.296	-0.074	0.186	0.354	0.443	0.404	0.315
-18	-0.245	-0.095	0.118	0.304	0.434	0.445	0.365
-16	-0.183	-0.079	0.066	0.211	0.321	0.353	0.330
-14	-0.123	-0.054	0.039	0.140	0.246	0.271	0.249
-12	-0.063	-0.026	0.020	0.072	0.138	0.185	0.179
-10	-0.003	0.000	0.003	0.012	0.036	0.067	0.083
-08	0.057	0.026	-0.015	-0.049	-0.065	-0.051	-0.013
-06	0.117	0.054	-0.031	-0.114	-0.176	-0.158	-0.100
-04	0.180	0.078	-0.056	-0.185	-0.263	-0.244	-0.179
-02	0.244	0.092	-0.094	-0.243	-0.347	-0.353	-0.294
00	0.307	0.077	-0.173	-0.337	-0.426	-0.362	-0.248

TABLE 4.- AERODYNAMIC CHARACTERISTICS FOR WING 3

CONTINUED

MACH NUMBER = 2.01	REYNOLDS NUMBER = 1.7 MILLION						FREE TRANSITION
$\alpha$ , DEG	FRACTION OF SEMISPAN						
	.05	.20	.35	.50	.70	.825	.95
SECTION NORMAL-FORCE COEFFICIENT							
-20	-.830	-.804	-.717	-.618	-.479	-.381	-.281
-18	-.654	-.655	-.600	-.522	-.409	-.334	-.250
-16							
-14							
-12	-.479	-.488	-.465	-.423	-.338	-.279	-.214
-10	-.399	-.408	-.396	-.366	-.301	-.254	-.197
-08	-.318	-.327	-.327	-.304	-.259	-.224	-.174
-06	-.240	-.245	-.251	-.239	-.211	-.188	-.151
-04	-.158	-.172	-.172	-.168	-.160	-.149	-.125
-02	-.079	-.073	-.088	-.084	-.094	-.099	-.088
00	-.009	.001	-.012	-.024	-.043	-.061	-.064
02	.057	.076	.072	.046	.013	-.013	-.031
04	.132	.155	.144	.119	.072	.033	.003
06	.205	.235	.218	.185	.124	.076	.032
08	.282	.311	.306	.253	.176	.121	.065
10	.363	.395	.371	.314	.218	.157	.093
12	.441	.479	.442	.373	.264	.194	.122
14							
16	.624	.631	.572	.478	.342	.254	.167
18							
20	.803	.791	.701	.582	.414	.310	.212
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-.273	-.072	.100	.237	.336	.345	.309
-18	-.220	-.066	.081	.197	.285	.300	.274
-16							
-14							
-12	-.162	-.057	.057	.156	.233	.249	.233
-10	-.136	-.048	.047	.134	.206	.225	.215
-08	-.109	-.039	.038	.110	.177	.198	.189
-06	-.083	-.030	.026	.085	.143	.166	.163
-04	-.056	-.020	.017	.059	.107	.131	.135
-02	-.028	-.010	.008	.028	.062	.086	.094
00	-.002	.001	.002	.010	.028	.053	.068
02	.020	.010	-.008	-.013	-.009	.011	.033
04	.045	.022	-.014	-.039	-.048	-.028	-.003
06	.070	.031	-.022	-.063	-.083	-.067	-.034
08	.099	.044	-.034	-.087	-.119	-.106	-.069
10	.123	.051	-.044	-.111	-.147	-.138	-.100
12	.149	.060	-.054	-.132	-.179	-.171	-.132
14							
16	.208	.068	-.075	-.175	-.235	-.225	-.181
18							
20	.262	.072	-.097	-.218	-.287	-.277	-.231

TABLE 4.- AERODYNAMIC CHARACTERISTICS FOR WING 3  
CONTINUED

MACH NUMBER = 2.01		REYNOLDS NUMBER = 1.7 MILLION					FIXED TRANSITION
$\alpha$ , DEG		FRACTION OF SEMISPAN					
		.05	.20	.35	.50	.70	.825
SECTION NORMAL-FORCE COEFFICIENT							
-20							
-18							
-16	-0.655	-0.657	-0.607	-0.527	-0.413	-0.334	-0.250
-14							
-12	-0.473	-0.496	-0.470	-0.426	-0.343	-0.284	-0.216
-10	-0.390	-0.402	-0.405	-0.369	-0.302	-0.254	-0.196
-08	-0.308	-0.330	-0.322	-0.308	-0.260	-0.226	-0.175
-06	-0.227	-0.259	-0.238	-0.245	-0.217	-0.193	-0.154
-04	-0.150	-0.176	-0.163	-0.166	-0.161	-0.151	-0.125
-02							
00	-0.028	-0.031	-0.045	-0.046	-0.063	-0.075	-0.077
02							
04	0.137	0.159	0.141	0.116	0.073	0.034	0.004
06	0.213	0.240	0.215	0.193	0.130	0.082	0.037
08	0.295	0.310	0.309	0.256	0.181	0.125	0.068
10	0.371	0.400	0.360	0.316	0.228	0.159	0.094
12	0.453	0.471	0.450	0.373	0.268	0.194	0.123
14							
16	0.616	0.634	0.568	0.478	0.344	0.253	0.167
18							
20							
SECTION PITCHING-MOMENT COEFFICIENT							
-20							
-18							
-16	-0.217	-0.063	0.082	0.198	0.288	0.300	0.274
-14							
-12	-0.161	-0.058	0.059	0.156	0.236	0.254	0.236
-10	-0.133	-0.050	0.049	0.135	0.207	0.226	0.213
-08	-0.105	-0.041	0.035	0.111	0.177	0.200	0.190
-06	-0.080	-0.031	0.023	0.087	0.147	0.171	0.166
-04	-0.052	-0.020	0.017	0.057	0.109	0.133	0.135
-02							
00	-0.009	-0.001	0.010	0.019	0.044	0.067	0.082
02							
04	0.046	0.020	-0.015	-0.038	-0.049	-0.030	-0.004
06	0.068	0.030	-0.022	-0.068	-0.088	-0.071	-0.039
08	0.101	0.041	-0.035	-0.091	-0.123	-0.110	-0.072
10	0.127	0.052	-0.042	-0.113	-0.155	-0.140	-0.101
12	0.153	0.058	-0.057	-0.134	-0.183	-0.171	-0.133
14							
16	0.205	0.065	-0.075	-0.177	-0.236	-0.224	-0.180
18							
20							

TABLE 4.- AERODYNAMIC CHARACTERISTICS FOR WING 3  
CONTINUED

MACH NUMBER = 2.01 REYNOLDS NUMBER = 3.1 MILLION FREE TRANSITION

$\alpha$ , DEG	FRACTION OF SEMISSPAN						
	.05	.20	.35	.50	.70	.825	.95
	SECTION NORMAL-FORCE COEFFICIENT						
-20	-.816	-.805	-.736	-.629	-.481	-.385	-.281
-18					-.411	-.341	-.252
-16							
-14							
-12	-.474	-.500	-.504	-.442	-.351	-.297	-.221
-10							
-08							
-06							
-04							
-02							
00	-.011	-.007	-.012	-.024	-.046	-.062	-.065
02							
04	.138	.154	.147	.121	.072	.033	.001
06							
08	.292	.313	.306	.257	.179	.120	.065
10							
12	.445	.462	.439	.368	.262	.188	.117
14							
16	.618	.630	.575	.474	.336	.252	.164
18							
20	.796	.780	.700	.576	.406	.312	.206
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-.269	-.077	.104	.240	.338	.347	.309
-18					.285	.306	.276
-16							
-14							
-12	-.160	-.059	.066	.163	.241	.265	.241
-10							
-08							
-06							
-04							
-02							
00	-.004	.000	.001	.009	.031	.054	.070
02							
04	.046	.021	-.014	-.040	-.049	-.028	-.001
06							
08	.099	.042	-.034	-.091	-.122	-.105	-.070
10							
12	.149	.059	-.054	-.132	-.179	-.166	-.126
14							
16	.205	.070	-.076	-.174	-.230	-.223	-.177
18							
20	.260	.079	-.097	-.215	-.280	-.278	-.224

TABLE 4.- AERODYNAMIC CHARACTERISTICS FOR WING 3  
CONCLUDED

MACH NUMBER = 2.01		REYNOLDS NUMBER = 3.1 MILLION		FIXED TRANSITION			
$\alpha$ , DEG		FRACTION OF SEMISPA					
		.05	.20	.35	.50	.70	.825
SECTION NORMAL-FORCE COEFFICIENT							
-20	-.829	-.824	-.731	-.635	-.486	-.389	-.284
-18					-.535	-.414	-.311
-16						-.286	-.252
-14							-.216
-12	-.465	-.494	-.476	-.428	-.343		
-10						-.224	
-08	-.307	-.330	-.332	-.308	-.259		
-06						-.173	
-04	-.141	-.153	-.159	-.153	-.148	-.137	-.115
-02							
00	-.009	-.004	-.023	-.026	-.047	-.061	-.066
02							
04	.141	.154	.140	.120	.074	.035	.003
06							
08	.287	.314	.297	.261	.180	.122	.066
10							
12	.442	.474	.442	.380	.273	.198	.122
14							
16	.619	.627	.574	.482	.348	.258	.168
18							
20	.811	.793	.707	.589	.413	.320	.213
SECTION PITCHING-MOMENT COEFFICIENT							
-20	-.272	-.075	.102	.244	.341	.351	.312
-18							
-16							
-14							
-12	-.156	-.059	.058	.159	.237	.256	.236
-10							
-08	-.106	-.043	.037	.112	.177	.199	.188
-06							
-04	-.050	-.022	.015	.051	.099	.120	.124
-02							
00	-.004	.000	.003	.009	.031	.053	.071
02							
04	.048	.020	-.013	-.040	-.050	-.030	-.003
06							
08	.098	.041	-.031	-.093	-.122	-.107	-.070
10							
12	.148	.058	-.053	-.139	-.187	-.175	-.131
14							
16	.204	.069	-.076	-.178	-.240	-.229	-.182
18							
20	.263	.077	-.098	-.222	-.285	-.285	-.232

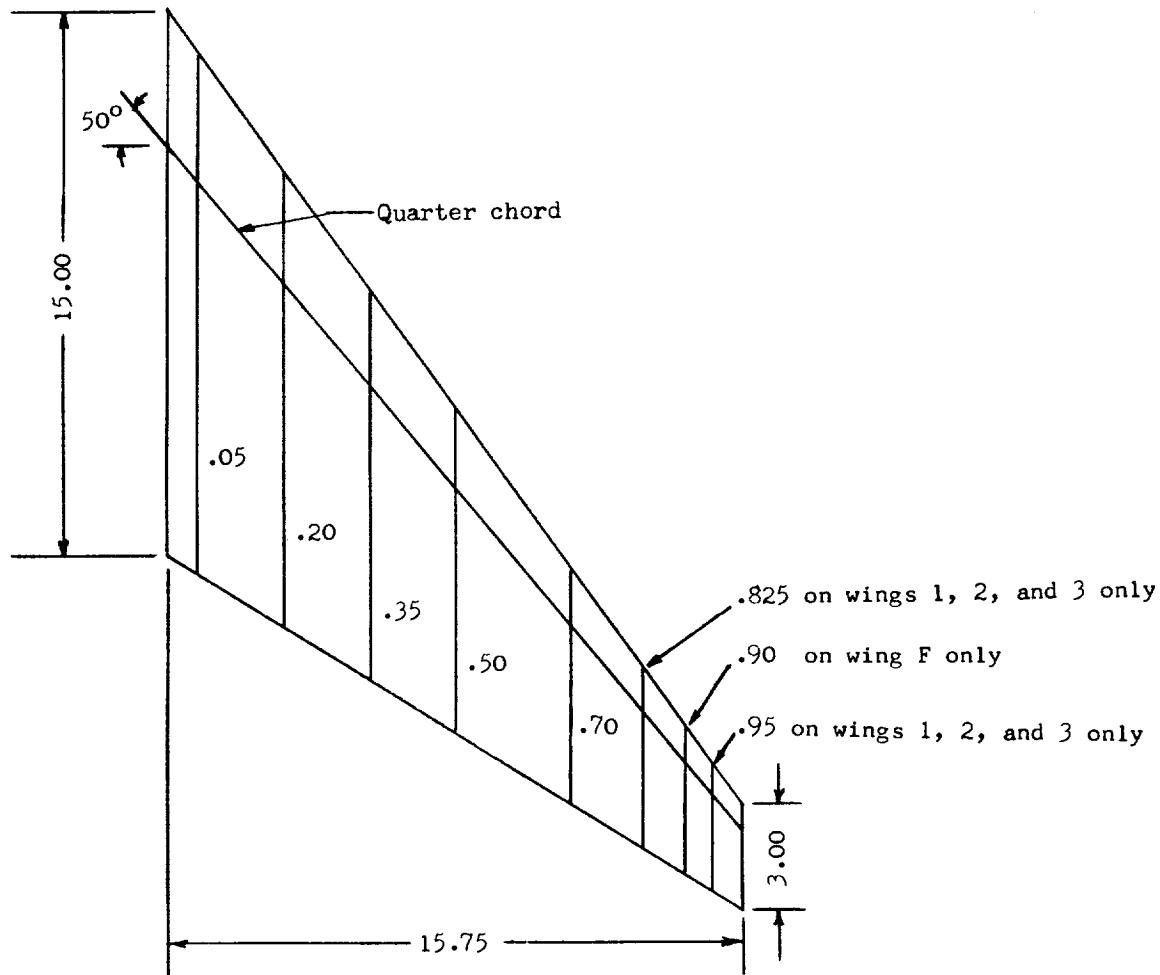


Figure 1.- Plan view of wings showing orifice stations. (Lengths are given in inches; stations are given in fractions of semispan.)